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(54) IMPROVEMENTS RELATING TO PRE-PASTED POROUS BASE SHEET MATERIALS FOR USE IN WALL COVERINGS

(71) We, WIGGINS TEAPE LIMITED, a British company, of P.O. Box 88, Gateway House, Basing View, Basingstoke, Hampshire, RG21 2EE, England (formerly of 3 Lincoln's Inn Fields, London WC2A 3EB), do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to methods of making pre-pasted porous base sheet materials for use in wall coverings, e.g. wall papers, and to materials made thereby. Such base sheet materials are used in the manufacture of moisture-resistant wall coverings, such as the so-called vinyl wall coverings, by laminating the pre-pasted base sheet material with a film of polyvinyl chloride or a similar polymer on the opposite surface from the pre-pasted layer of adhesive. The base sheet material is porous and it is necessary that the pre-pasted layer of adhesive should also be capable of permitting escape of gas trapped during the laminating process. Such gas may be air or water-vapour or a mixture of both. This is usually achieved by applying an aqueous paste of the adhesive to the base sheet material, drying the paste and subsequently rendering the dried continuous film of adhesive porous by physically shattering it in a separate process, by passing the sheet material around a rigid bar breaker mounted separately from the adhesive applying machine. This process tends to produce a variable product, particularly when using a wide width machine and also involves extra cost because of the separate breaking process.

In one aspect the invention provides a pre-pasted porous base sheet material for use in a wall covering having a gas-permeable coating of an aerated adhesive.

According to a further aspect of the invention, a method of making a pre-pasted porous base sheet material for use in a wall covering comprises the steps of applying a layer of an adhesive in liquid form to one surface of a porous base sheet material and drying the adhesive to leave a dry aerated coating, and, if the terated coating is not gas-permeable or adequately gas-permeable, rendering the aerated coating gas-permeable by mechanical means.

The aerated coating will, in many cases, include passages which extend right through the dried adhesive layer. In other cases, the passages may extend only partially through the dried adhesive layer, which necessitates a further step for making the coating gas-permeable, for example passing the sheet material carrying the dried aerated adhesive layer over a rigid bar breaker to open passages right through the adhesive layer.

Preferably, a blowing agent is incorporated in the adhesive before application thereof to the base sheet material and which is activated after application of the adhesive thereby to aerate the adhesive. The blowing agent may be activated by heat applied for driving the adhesive.

The blowing agent may be a decomposable solid, for example benzene sulphonyl hydrazine, which is suspended in the liquid adhesive, or it may be a decomposable or volatile liquid. The liquid blowing agent may be a water insoluble ester of an azodicarboxylic acid used in conjunction with a suitable activator, such as a metal salt of a stearate or laurate.

Alternatively the blowing agent may be contained in microcapsules suspended in the liquid adhesive. A volatile liquid blowing agent may be incorporated in the microcapsules, which during drying of the liquid adhesive swell, and allow the volatile liquid, for example, iso-butane to escape from the capsules. After drying, the adhesive will then contain large, weak capsules containing

air, which are easily rupturable to render the adhesive coating gas-permeable.

In another alternative, the blowing agent comprises at least two reagents which react together either with or without water to aerate the adhesive. One of the reagents may be, for example, sodium bicarbonate and the other a weak acid, for example citric or tartaric acid. The reaction occurring thus releases carbon dioxide and aerates the adhesive.

In another alternative, the liquid adhesive is mechanically aerated just prior to coating, and foaming agents may be incorporated into the liquid adhesive in order to assist in the stabilisation of the foam.

It will be appreciated from the foregoing that references herein to "aerated" and "aeration" are not to be construed solely as referring to air — the gas in the aerated coating may be other than air.

The adhesive is preferably a water-remoistenable adhesive which is applied in liquid form with a viscosity between 1000 to 40,000 cps. It may, for example, be a modified starch, dextrin, carboxymethyl-cellulose or polyvinyl alcohol.

The layer is preferably applied in a coating weight of between 4 and 30 grams per square metre, more preferably between 15 and 25 grams per square metre.

The invention also resides in a pre-pasted porous base sheet material for use in a wall covering, wherein the pre-pasted layer of adhesive is aerated to form passages for water vapour and gases by a method as outlined above. The passages formed by aeration may comprise, for example, between 10 and 20 blow holes per square centimetre. The base sheet material is preferably paper made from a furnish containing up to 100% chemical wood pulp and/or up to 80% mechanical wood pulp. Cotton or sythetic fibres may also be included.

The invention will now be illustrated by reference to the following Example:—

In this embodiment, a wall paper base material of 85 gm/m² weight, produced from a furnish of 60% mechanical wood pulp and 40% chemical wood pulp with a moisture content of 5%, was provided with an adhesive layer of 23 gm/m² weight in a four-roll contracoating and drying unit running at 100 metres/minute. The coating section of this unit has a pick-up roller dipping into an adhesive bath, a metering roller rotating in the same direction as the pick-up roller to strip off a thin layer of adhesive, an applicator roller rotating in the opposite direction and receiving adhesive from the metering roller and applying it to the paper web, and a backing roller rotating in the same direction as the first two rollers and forming a backing for the web. The drying section of the unit comprises a sectional arch-backed felted tunnel in which a drying temperature of up to 350°F was maintained. The adhesive used was a blend of modified starches with sodium nitrate as a viscosity regulator to maintain the viscosity at 10,000 to 12,000 cps. The blowing agent was benzene sulphonyl hydrazine, sold under the name Genitron (Registered Trade Mark), a solid, heat-sensitive, nitrogen-releasing substance, which was added in a proportion of 5% by weight of the dry adhesive. During the drying of the adhesive, the blowing agent was activated to aerate the adhesive layer, forming between 10 and 20 blow holes per square centimetre. The porosity of the aerated layer was found to be dependent on the drying temperature, the paper speed through the drying section, and the time allowed for drying.

In some cases the blow-holes did not extend right through the adhesive layer, so that no porosity was achieved. Porosity could easily be achieved in such cases by lightly breaking the weakened adhesive layer by passing the sheet material over a conventional rigid bar breaker. The material was then found suitable for lamination.

WHAT WE CLAIM IS:—

1. A pre-pasted porous base sheet material for use in a wall covering having a gas-permeable coating of an aerated adhesive.

2. A method of making a pre-pasted porous base sheet material for use in a wall covering comprising the steps of applying a layer of an adhesive in liquid form to one surface of a porous base sheet material and drying the adhesive to leave a dry aerated coating, and, if the aerated coating is not gas-permeable or adequately gas-permeable, rendering the aerated coating gas-permeable by mechanical means.

3. A method according to Claim 2, wherein a blowing agent is incorporated in the adhesive before application thereof to the base sheet material and which is activated after application of the adhesive thereby to aerate the adhesive.

4. A method according to Claim 3, wherein the blowing agent is a decomposable solid which is suspended in the liquid adhesive.

5. A method according to Claim 3, wherein the blowing agent is a decomposable or volatile liquid.

6. A method according to Claim 3, wherein the blowing agent comprises at least two reagents which will react together to aerate the adhesive.

7. A method according to Claim 3, wherein the blowing agent is contained in microcapsules suspended in the liquid adhesive.

8. A method according to Claim 7,

wherein the blowing agent contained in the microcapsules is a volatile liquid.

9. A method according to any one of Claims 3 to 8, wherein the blowing agent causes aeration during drying of the adhesive.

10. A method according to Claim 9, wherein the blowing agent is a decomposable liquid and the adhesive further comprises an activator for the blowing agent to cause aeration of the adhesive.

11. A method according to Claim 2, wherein the liquid adhesive is mechanically aerated before coating.

12. A method according to Claim 11, wherein the liquid adhesive comprises a foaming agent.

13. A method according to any one of Claims 2 to 12, wherein the passages in the dried layer of adhesive extend only partially through the dried adhesive layer, and wherein the sheet material is subsequently passed over a rigid bar breaker to open up passages right through the adhesive layer.

14. A method according to Claim 2 of making a pre-pasted porous base sheet material for use in a wall covering substantially as herein described in the Example.

15. A pre-pasted porous base sheet material for use in a wall covering made by the method according to any one of Claims 2 to 14.

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